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Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

Re: Inventors: Ronald Schauer and John Charles Davies
Title: INSTALLATION DOCKING PEDESTAL FOR PRE-FACILITATION OF WAFER FABRICATION EQUIPMENT

Transmitted herewith is the patent application identified above, including:

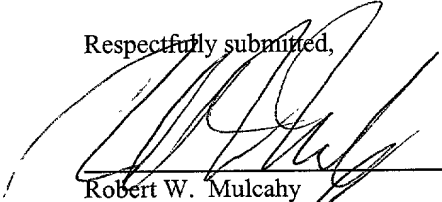
- ☒ Specification, claims and abstract, totaling 19 pages.
- ☒ Drawings totaling ten pages, ☐ Formal ☒ Informal.
- ☒ Executed Declaration and Power of Attorney.
- ☒ Assignment of the invention to Applied Materials, Inc.
- ☒ Assignment Recordation Cover Sheet
- ☐ PTO Form 1449 and Information Disclosure Statement with no cited reference.
- ☒ Return Postcards

FEE CALCULATION					
Fee Items	Claims Filed	Included With Basic Fee	Extra Claims	Fee Rate	Total
Total Claims	20	- 20 =	-0-	X \$18.00	\$0.00
Independent Claims	4	- 3 =	1	X \$80.00	\$80.00
Basic Filing Fee				\$710.00	\$710.00
TOTAL FEES					\$790.00

- ☒ The Commissioner is hereby authorized to charge \$790.00 to Deposit Account No. 50-1074.
- ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 50-1074. A duplicate copy of this transmittal is enclosed.
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Express Mail Receipt No. EK408967731US
Date of Deposit: 11-03-00
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Respectfully submitted,

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APPLICATION FOR UNITED STATES LETTERS PATENT

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TITLE:

INSTALLATION DOCKING
PEDESTAL FOR PRE-
FACILITATION OF WAFER
FABRICATION EQUIPMENT

DOCKET NO.:

4448/IBSS/DV

APPLIED MATERIALS, INC.

CERTIFICATE OF MAILING UNDER 37 CFR 1.10

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INSTALLATION DOCKING PEDESTAL FOR
PRE-FACILITATION OF WAFER FABRICATION EQUIPMENT

FIELD OF THE INVENTION

5 This invention relates generally to manufacturing equipment and more particularly to a method and apparatus for facilitating installation and use of wafer fabrication equipment in a manufacturing environment.

10 BACKGROUND OF THE INVENTION

15 For the installation of manufacturing equipment, and particularly when installing wafer fabrication equipment at a factory location, it becomes necessary to provide a separate structure to support the heavy tool and to transfer the weight thereof to the underlying floor (for example, a poured concrete waffle-grid floor). The equipment support structure is separate from the building support structure and typically comprises a plurality of fabricated support legs which each extend up from one of the solid sections of the
20 underlying waffle-grid floor to engage a mounting foot on the underside of the equipment. The support legs, which may be steel jacks or poured concrete piers, are generally custom-fabricated for the installation, which necessarily requires additional time and expenditure. Crossbeam members
25 attached to the support legs may also be required to support the weight of the equipment, particularly for irregularly-shaped systems for which a given mounting foot may not align to a solid section of the underlying flooring. In addition, if raised flooring is needed for access to the
30 equipment, the prior art support method requires that yet another set of structural supports be installed to support the raised flooring.

35 The Semiconductor Equipment Manufacturing Institute (hereinafter "SEMI") has proposed a standard support structure to be used for all semiconductor factory locations. The proposed structure is a free-standing rectangular pedestal having a rectangular base with a plurality of legs positioned so as to evenly transmit the suspended weight of

the equipment to the underlying floor structures. The legs of the SEMI pedestal extend up from the interstices of the waffle-grid floor at the basement or other facilities level beneath the manufacturing level flooring (or "raised flooring"), to support the rectangular base at the manufacturing level. The SEMI pedestal's rectangular base includes a plurality of connection points for bringing facilities (e.g., vacuum forelines, gas supply lines, electrical conduits, evacuation lines, etc.) from the lower facilities level up to the equipment level, and additionally includes floor support flanges attached at the periphery of the rectangular base to support raised flooring for operator access to the manufacturing equipment.

What has been proposed for installing manufacturing equipment in the SEMI pedestal is that, using a datum point which is outside of the rectangular base, the manufacturing equipment is aligned on the rectangular pedestal in such a way that an operator can access the machine from a position on the raised floor. The manufacturing equipment is then supported by crossbeams and cantilevers which attach to the rectangular base. As necessary, additional customized support legs may also be required when installing equipment on the SEMI pedestal. The advantages of using the SEMI pedestal include the fact that the pedestal may be of standard size, thereby providing a reference size for architects and construction personnel. In addition, with the standard pedestal having pre-established facilities connection locations, the manufacturing site can be pre-plumbed for provision of facilities such as vacuum lines, etc.

Drawbacks to the proposed SEMI pedestal include the customization necessary to ensure adequate support of irregularly-shaped equipment (i.e., neither rectangular nor to scale with the pedestal frame) and the retrofitting necessary to bring the facilities from the pre-plumbed locations on the rectangular base to the actual facilities connection points on the manufacturing equipment. Particularly when dealing with gas flow lines and evacuation lines, any additional line length and/or bends in the lines

can have a major impact on the flow through the lines and consequently on the equipment and the processing conducted by the equipment.

Accordingly, an improved manufacturing equipment support system is desired which may provide both manufacturing equipment support and pre-plumbing of facilities for manufacturing equipment installation, and that may be retrofitable to provide support for pre-existing manufacturing equipment installations.

SUMMARY OF THE INVENTION

The present invention provides support apparatus for manufacturing equipment comprising a support pedestal having (1) a plurality of support legs, including at least one support leg aligned to each one of a plurality of load-bearing mounting feet found on the bottom of the manufacturing equipment to be supported by the pedestal, and a frame disposed on the plurality of support legs; and/or (2) a frame with an outline which substantially duplicates the bottom outline of the manufacturing equipment to be supported, and a plurality of support legs coupled to the frame. The support apparatus additionally may comprise at least one facilities connection locator (e.g., a plate or bucket having holes through which facilities such as air, fluid, electric, etc., can be connected) fixedly mounted to the support frame so as to provide facilities connection locations for aligning facilities supply lines to the manufacturing equipment.

Other features and advantages of the present invention will become more fully apparent from the following detailed description of the preferred embodiments, the appended claims and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic top perspective view of manufacturing equipment installed at a manufacturing location in accordance with the prior art;

FIG. 2 is a schematic top perspective view of the proposed SEMI rectangular support pedestal installed at a manufacturing location;

5 FIG. 3 is a schematic top perspective view of the proposed SEMI rectangular support pedestal with manufacturing equipment installed on the support pedestal;

FIG. 4 is a schematic top perspective view of one embodiment of the support pedestal in accordance with the present invention;

10 FIG. 5 is a schematic top perspective view of the support pedestal of FIG. 4 installed at a manufacturing location and having manufacturing equipment mainframe attached thereto;

15 FIG. 6 is a schematic top perspective view of an alternative embodiment of the support pedestal of the present invention installed at a manufacturing location;

FIG. 7 is a schematic top perspective view of the support pedestal of FIG. 6 installed at a factory location with manufacturing equipment installed thereon;

20 FIG. 8 is a schematic top perspective view of the support pedestal of the present invention installed below the level of a raised floor;

FIG. 9 is a side view of the embodiment of FIG. 8 with manufacturing equipment installed thereon; and

25 FIG. 10 is a side view of gooseneck connectors at a facilities connection locator of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

30 FIG. 1 is a schematic top perspective view of manufacturing equipment installed at a manufacturing location in accordance with the prior art. As depicted therein, manufacturing equipment 111, shown as semiconductor processing equipment including two loadlock chambers 113 and 115, a mainframe 117 and one or more processing chambers 119
35 (only one shown), is supported by a plurality of support legs 121 which extend from mounting feet (not shown) on the bottom of the manufacturing equipment 111 down to base mount location pads 123 disposed on an underlying waffle-grid floor

125. Typically each of the support legs 121 is custom fabricated for the installation, in order to assure that the manufacturing equipment 111 is level, and also so as to connect the support legs to the interstices of the waffle sub-floor. Generally, the suppliers of the manufacturing equipment 111 will provide mounting feet (not shown) which are of adjustable height. In that way upon final installation of the manufacturing equipment 111, when each of the mounting feet is attached to a support leg 121, final leveling of the manufacturing equipment 111 can be conducted by adjusting the height of each of the mounting feet. While a manufacturing location will have facilities lines 127 brought to the manufacturing level, further plumbing is required for connection of the facilities lines 127 to the manufacturing equipment 111 after the physical installation (i.e., anchoring of the manufacturing equipment 111 on support legs 121 and leveling thereof) is completed. As noted above, disadvantages of the FIG. 1 prior art installation include the additional time and cost for providing customized support legs 121 and the difficulty in pre-planning or pre-facilitating the manufacturing location due to the fact that the locations of the support legs 121 may interfere with pre-plumbed facilities lines 127.

FIG. 2 is a schematic top perspective view of the proposed rectangular SEMI support pedestal 130 installed at a manufacturing location. The SEMI support pedestal 130 provides an alternative to the customized support legs 121 of FIG. 1. The SEMI support pedestal 130 comprises a rectangular pedestal frame 135 supported on a plurality of SEMI support pedestal legs 131, each of which is aligned to or near one of the interstices of the waffle-grid floor 125.

The SEMI pedestal frame 135 includes a plurality of SEMI facilities connection locations 137 for establishing pre-facilitation locations to which facilities lines 127 can be pre-plumbed prior to the installation of the manufacturing equipment 111 of FIG. 3. The SEMI pedestal frame 135 additionally may be adapted to support raised flooring 139.

FIG. 3 is a schematic top perspective view of the proposed SEMI support pedestal 130 with manufacturing equipment 111 installed thereon. With like reference numerals indicating previously-referenced components, FIG. 3 depicts the SEMI support pedestal 130 having a rectangular SEMI pedestal frame 135 disposed on a plurality of SEMI pedestal support legs 131 which extend down to base mount locations on the waffle-grid floor 125. SEMI facilities connection locations 137 are provided along the SEMI pedestal frame 135 as pre-facilitation locations for connection of facilities lines 127. When manufacturing equipment 111 is installed on the SEMI support pedestal 130, crossbeam members 138 typically must be attached to the SEMI pedestal frame 135 to support the manufacturing equipment 111, and to transfer and distribute the weight of the manufacturing equipment 111 to the SEMI support pedestal 130. Given the fact that the manufacturing equipment 111 has a unique shape, the installation of the manufacturing equipment 111 on a SEMI support pedestal 130 requires "customization" for both support and facilities connections. The SEMI support pedestal 130, by attachment and alignment to the top edge of the SEMI pedestal frame 135, does provide the alignment and leveling reference points for installation of manufacturing equipment 111, and provides pre-plumbing reference points (i.e., the facilities connection locations 137). Nonetheless, the installation of the manufacturing equipment 111 requires customized support fabrication of the crossbeam members 138 and/or cantilevers (not shown), and customized retrofitting for connecting the facilities lines 127 from the facilities connection locations 137 to the actual facilities connection points (not shown) on the manufacturing equipment 111. As noted above, modifications to certain facilities lines can adversely affect the flow through those lines to the potential detriment of both the manufacturing process and the manufacturing equipment 111.

FIG. 4 is a schematic top perspective view of a support pedestal 140 configured in accordance with the

present invention. The inventive support pedestal 140 comprises a support frame 145 having a plurality of support legs 141 extending downward therefrom. The support frame 145 has a frame outline which substantially duplicates the bottom outline of the mainframe 117 of the manufacturing equipment 111, with the "bottom outline" of the mainframe 117 being defined by the lower frame of the mainframe 117 itself. In one aspect the support frame 145 may be monolithic so as to provide the enhanced support integrity which comes from a "seamless" frame. The support frame 145 includes brackets 147 for engaging the load-bearing mounting feet of the manufacturing equipment (if any). The support legs 141 are adjustable and comprise an outer leg section 144 fixedly mounted (e.g., bolted or welded) to the support frame 145, and an inner leg section 142. The inner leg section 142 is slideably mounted in the outer leg section 144, so that the length of the support legs 141 can be adjusted and, once optimized, locked in place by bolting or welding the inner leg section 142 to the first outer leg section 144. The support legs 141 are disposed on base mount location pads 143, which can be affixed (e.g., removably via bolts, or welded) to the support legs 142 prior to installation or can be provided at the installation site. Additionally affixed to the support legs 141 are optional seismic braces 149. A first end of each seismic brace 149 is fixedly mounted to a support leg 141 as shown, (or alternatively could be attached directly to the waffle grid flooring) while a second end of the seismic brace 149 is provided for attachment to the manufacturing equipment 111 upon installation thereof.

The inventive support pedestal 140 includes at least one facilities connection locator 150 which is fixedly mounted to the support frame 145 and which establishes the facilities connection locations, representatively shown as the four facilities connection locations 151-154, which exactly match the facilities connection points on the manufacturing equipment 111. Optional outer flanges (not shown) at the periphery of the support frame 145, as well as

optional inner flanges (not shown) are provided for supporting raised flooring (as shown in FIG. 5).

FIG. 5 is a schematic top perspective view of the inventive support pedestal 140 of FIG. 4, installed at a manufacturing location and having the mainframe 117 attached thereto. The inventive support pedestal 140 includes the support frame 145, having a frame outline which substantially duplicates (and preferably exactly duplicates) the bottom outline of the mainframe 117, and a plurality of support legs 141, each of which extends to a base mount location pad 143 positioned on the waffle-grid floor 125. In at least one embodiment of the invention, the frame outline need not substantially (or otherwise) duplicate the bottom outline of the mainframe 117. Seismic braces 149 are attached to the support legs 141 and to the mainframe 117. The facilities connection locator 150 is attached to the support frame 145 to provide the fixed facilities connection locations 151-154 (shown in FIG. 4). The illustrated support pedestal 140 may have raised flooring (not shown) attached at the periphery of the support frame 145. It is to be noted that the support pedestal 140 can alternatively be installed just below the level of the raised flooring, as depicted in FIG. 8 (discussed hereinbelow).

The inventive support pedestal 140 provides manufacturing equipment alignment (due to the shape of the pedestal frame 145) and leveling (due to the adjustable legs), as well as providing fixed facilities connection locations 151-154, all of which can be established in advance of the manufacturing equipment installation with reference to a datum point 100 (FIG. 7) of the factory location. That is, a datum point is identified at the factory location and the support pedestal is aligned, leveled and plumbed with reference thereto. Since the frame outline of the support frame 145 matches the bottom outline of the mainframe 117 of the manufacturing equipment which is installed on the support frame 145, and since the quantity and positioning of the plurality of support legs 141 has been adapted to engage the manufacturing equipment's load-bearing mounting feet for

support of the particular manufacturing equipment being supported by the inventive support pedestal 140, no additional support structures (such as the custom-fabricated steel jacks, concrete piers, crossbeams or cantilevers) are required. Furthermore, given the fact that all of the facilities connection locations 151-154 of the facilities connection locator 150 are pre-aligned to the facilities connection points on the manufacturing equipment itself, no retrofitting of facilities lines and connectors is required, thereby avoiding interference with flow patterns within the facilities lines. Using the factory location's datum point, therefore, the factory location can be pre-facilitated with all of the facilities lines pre-plumbed to the specified location of the facilities connection locations 151-154 at the facilities connection locator 150.

The support pedestal 140 is adaptable to specific manufacturing equipment configurations, as illustrated in FIG. 6. For the installation of a semiconductor processing system, such as is depicted in FIG. 1, which includes not only the mainframe processing unit 117 but also the factory interface 114 with loadlock 113 and 115 and a process chamber 119, the support pedestal 140 can be augmented with at least one additional support 160, including an additional frame 165 supported by additional support legs 161 extending to additional base mount location pads 163 to support the factory interface 114, the loadlocks 113, 115 or the processing chamber 119 (FIG. 1). The components of the addition support 160 may be configured in the same manner as the components of the support pedestal 140 with adjustable legs 161 positioned below load bearing mounting of the manufacturing equipment positioned on the additional support 160 and/or frame 165 that duplicates the bottom of the manufacturing equipment. The additional support component 160 may be joined to the support pedestal 140 by connecting segments 167. Alternatively, however, the pedestal frame 140 can be extended to include the support for the additional manufacturing equipment (e.g., the processing chamber 119). Thus, a single support pedestal 140 may be configured to

support one or more pieces of manufacturing equipment or a plurality of support pedestals may be coupled directly or via a connecting segment 167. In this example of FIG. 5, the support pedestal 140 includes an additional facilities connection locator 170 with additional facilities connection locations (171 of FIG. 8) as needed (e.g., for the additional processing chamber 119).

FIG. 7 is a top perspective view of the support pedestal 140 at a factory location with the manufacturing equipment 111, including the factory interface 114, the loadlocks 113 and 115, the mainframe processing unit 117 (shown partially cut away so that the bottom footprint thereof is visible) and the additional processing chamber 119 installed thereon. The illustrated additional processing chamber 119, like the factory interface 114, may be supported independently as described with reference to FIG. 6. The factory interface 114 is supported by the additional support component 160 comprising additional frame component 165 supported by additional support legs 161 which extend down to additional base mount location pads 163. The mainframe 117 of the manufacturing equipment 111 is mounted on the support frame 145, which is in turn supported by support legs 141 which extend to the base mount location pads 143 coupled (e.g., welded or bolted) to the waffle-grid flooring 125. In the FIG. 7 embodiment, the mainframe processing unit 117 has been provided by the manufacturing equipment supplier on its own mounting frame 156 to which load-bearing mounting feet 157 are affixed. In such an embodiment, the bottom outline of the mainframe 117 is defined by the locations of the load-bearing mounting feet 157 as mounted to the mounting frame 156 (provided by the manufacturing equipment supplier) for the mainframe 117.

FIG. 8 is a schematic top perspective view of the support pedestal 140 of the present invention installed below the level of the raised flooring 168. In such an alternate embodiment, the support frame 145 (not shown) would be installed on support legs 141 which extend down to base mount location pads 143 on the waffle-grid flooring 125 as in the

previously-described embodiments. Raised flooring 168 would be installed on top of the support pedestal 140, with openings provided for the facilities connection locator 150 of the mainframe 117 (not shown), for the additional facilities connection locations 171 of the additional facilities connection locator (not shown) which is provided for the additional processing chamber 119 (not shown), and for the brackets 147 which will engage the load-bearing mounting feet 157 of the manufacturing equipment 111.

FIG. 9 is a side view of the embodiment of FIG. 8 with manufacturing equipment 111 installed thereon. As shown therein, the raised flooring 168 has the openings for brackets 147 (FIG. 8) which accommodate load-bearing mounting feet 157. The mainframe processing unit 117 is provided on its mounting frame 156 which includes load-bearing mounting feet 157 to be attached to the brackets 147 (FIG. 8) of the underlying support pedestal 140. The support frame 145 of the support pedestal 140 is fixedly attached to the plurality of support legs 141, each of which extends to and is coupled to the base mount location pads 143 on the waffle-grid floor 125. Facilities connections 155 are shown projecting up from the facilities connection locations 151-154 (not shown) of facilities connection locator 150 to be provided to the mainframe processing unit 117. The additional processing chamber 119 has additional facilities connections 175 extending up through its additional facilities connection locations 171 (FIG. 6) associated with the additional facilities connection locator 170.

FIG. 10 is a side view of gooseneck connectors 191 which provide facilities connection between the facilities supply lines 193 of a factory location and the facilities connection locations 151-154 of a facilities connection locator 150 of the present invention (or any other facilities connection locations). The gooseneck connectors 191 comprise a plurality of connector segments 195 which are alternately oriented to flexibly approximate a "straight" flow path between the facilities supply lines 193 and the facilities

connection locations of the facilities connection locator
150.

The invention has been described with reference to
several specific embodiments. One having skill in the
5 relevant art will recognize that modifications may be made
without departing from the spirit and scope of the invention.
For example, it is to be noted that the manufacturing
equipment 111 may include some non-load-bearing feet
(hereinafter referred to as "anchoring feet") which may be
10 provided for additional lateral securing of the manufacturing
equipment to the support frame 145. The number and locations
of the support legs 141 of the inventive support pedestal 140
are selected to match the number and locations of the
load-bearing mounting feet 157 on the bottom outline of the
15 manufacturing equipment. It is to be understood that,
without departing from the invention as taught and claimed,
additional anchoring feet may be provided on the
manufacturing equipment, and additional brackets for engaging
the anchoring feet may be provided on the inventive support
20 pedestal 140 in locations which may or may not align with
support legs 141.

In addition, the illustrated seismic braces,
including variable length ball-end rods 149 of FIG. 4, are
merely representative of one embodiment of the optional
25 feature. An alternative embodiment would include a piece of
thick metal strapping, which would first be secured to the
support leg, followed by custom-bending in situ, and then
bolting or welding into place. By either method, the support
pedestal would be triangulated in orthogonal directions, thus
30 preventing the vertical support legs from deforming to the
point of failure during a seismic event.

While it has been taught that a molded, monolithic
pedestal frame is advantageous for mechanical integrity,
clearly a pedestal frame comprising a plurality of bonded
35 (e.g., welded) or fixedly coupled (e.g., bolted) pieces can
be substituted without departing from the invention as
claimed.

Yet another modification comprises the use of standardized spacers as the mounting and anchoring feet, in place of the adjustable mounting and anchoring feet which have traditionally been employed for in situ leveling of manufacturing equipment. The inventive support pedestal has adjustable legs which are adjusted prior to installation of the manufacturing equipment to thereby pre-establish the alignment and leveling of the manufacturing equipment; therefore, fixed spacers are recommended since the fixed spacers maintain the fixed parallel relationship between the support frame and the manufacturing equipment which has been established relative to the datum point and since no in situ leveling of the manufacturing equipment will be required.

The support leg sections could also be tubular, right angle sections ("angle iron"), or triangular or etc., they need not be rectangular. Also, the lower portion of the support leg could be either the outer or the inner portion. As an alternative to being bolted-on, the mounting of the support legs to the pedestal frame could also be welded-on, designed so that they would attach underneath the frame (in compression), or designed to fit into underside receptacles fabricated as part of the frame itself, or some combination of these.

Finally, pre-facilitation of a factory location can be conducted using a "map" of the support pedestal and its facilities connection locator with facilities connection locations defined relative to a datum point of the factory location. A medium (polycarbonate film) having a full-scale outline of the inventive support pedestal, with or without facilities connection locations denoted, can be delivered to the factory location prior to installation of the support pedestal. Once the polycarbonate film is spread out on the factory floor relative to the datum point, the coordinates for each facilities connection location will be precisely defined in situ and appropriate plumbing, electrical, construction can be performed prior to installation of the inventive support pedestal.

1. Support apparatus for manufacturing equipment having a bottom outline and a plurality of load-bearing mounting feet disposed along the equipment's bottom outline comprising:

a frame disposed on the plurality of support legs, the frame having a frame outline which substantially duplicates the bottom outline of the manufacturing equipment.

3. The support apparatus of Claim 2 wherein the underlying flooring comprises a waffle-grid floor and wherein each base mount location comprises a pad disposed at an interstice of the waffle-grid floor.

5. The support apparatus of Claim 4 wherein the monolithic frame comprises a molded steel frame.

6. The support apparatus of Claim 1 wherein each of the plurality of support legs comprises an adjustable length leg.

8. The support apparatus of Claim 1 further comprising flanges along the inner edges of the frame to support raised flooring.

9. The support apparatus of Claim 7 further comprising flanges along the inner edges of the frame to support raised flooring.

10. The support apparatus of Claim 1 further comprising at least one facilities connection locator integrated into the periphery of the frame.

11. The support apparatus of Claim 10 wherein the at least one facilities connection locator provides a plurality of connection points for connecting site facilities to the manufacturing equipment.

12. The support apparatus of Claim 11 further comprising gooseneck couplings attached at the plurality of connection points.

13. The support apparatus of Claim 1 further comprising a plurality of seismic braces each affixed to one of the support legs and adapted to fix to a piece of manufacturing equipment to be supported by the support apparatus.

14. A manufacturing equipment installation comprising:

an underlying flooring located at a subfloor level;

manufacturing equipment located at a raised floor level, the equipment having a plurality of load bearing mounting feet and one or more facilities connection points;

a support frame for supporting the manufacturing equipment comprising a plurality of support legs including at least one support leg aligned to each one of the plurality of load bearing mounting feet and a frame disposed on the plurality of support legs, the frame having a frame outline which substantially duplicates the bottom

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	2145	2146	2147	2148	2149	2150	2151	2152	2153	2154	2155	2156	2157	2158	2159	2160	2161	2162	2163	2164	2165	2166	2167	2168	2169	2170	2171	2172	2173	2174	2175	2176	2177	2178	2179	2180	2181	2182	2183	2184	2185	2186	2187	2188	2189	2190	2191	2192	2193	2194	2195	2196	2197	2198	2199	2200	2201	2202	2203	2204	2205	2206	2207	2208	2209	2210	2211	2212	2213	2214	2215	2216	2217	2218	2219	2220	2221	2222	2223	2224	2225	2226	2227	2228	2229	2230	2231	2232	2233	2234	2235	2236	2237	2238	2239	2240	2241	2242	2243	2244	2245	2246	2247	2248	2249	2250	2251	2252	2253	2254	2255	2256	2257	2258	2259	2260	2261	2262	2263	2264	2265	2266	2267	2268	2269	2270	2271	2272	2273	2274	2275	2276	2277	2278	2279	2280	2281	2282	2283	2284	2285	2286	2287	2288	2289	2290	2291	2292	2293	2294	2295	2296	2297	2298	2299	2300	2301	2302	2303	2304	2305	2306	2307	2308	2309	2310	2311	2312	2313	2314	2315	2316	2317	2318	2319	2320	2321	2322	2323	2324	2325	2326	2327	2328	2329	2330	2331	2332	2333	2334	2335	2336	2337	2338	2339	2340	2341	2342	2343	2344	2345	2346	2347	2348	2349	2350	2351	2352	2353	2354	2355	2356	2357	2358	2359	2360	2361	2362	2363	2364	2365	2366	2367	2368	2369	2370	2371	2372	2373	2374	2375	2376	2377	2378	2379	2380	2381	2382	2383	2384	2385	2386	2387	2388	2389	2390	2391	2392	2393	2394	2395	2396	2397	2398	2399	2400	2401	2402	2403	2404	2405	2406	2407	2408	2409	2410	2411	2412	2413	2414	2415	2416	2417	2418	2419	2420	2421	2422	2423	2424	2425	2426	2427	2428	2429	2430	2431	2432	2
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outline of the manufacturing equipment and having a plurality of pre-defined facilities connection points aligned to the one or more facilities connection points of the manufacturing equipment; and

5 facilities supply connections extending from the subfloor level to connect to the manufacturing equipment at the plurality of pre-defined facilities connection points.

10 15. The installation of Claim 14 wherein at least one facilities connection locator is coupled to the support frame to define the plurality of pre-defined facilities connection points and wherein the facilities supply connections extend to the at least one facilities connection locator.

15 16. The installation of Claim 14 further comprising at least one seismic brace connected from at least one of the plurality of support legs to the manufacturing apparatus.

20 17. A method for providing installation of manufacturing equipment at a factory location, the equipment having a bottom outline and a plurality of mounting feet disposed along the bottom outline, comprising the steps of:

25 defining a datum point at the factory location;

defining a plurality of facilities connection point locations for manufacturing equipment support apparatus based on the datum point;

30 pre-facilitating the factory location to the plurality of facilities connection point locations;

installing manufacturing equipment support apparatus comprising a plurality of support legs including at least one support leg adapted to align to each one of the manufacturing equipment's plurality of mounting feet and a frame disposed on the plurality of support legs, the frame having a frame outline which substantially duplicates the bottom outline of the manufacturing equipment, the support

frame having a plurality of pre-defined facilities connection points located at the facilities connection point locations; and

5 installing the manufacturing equipment on the manufacturing equipment support apparatus.

18. The method of Claim 17 further comprising pre-aligning the manufacturing equipment support apparatus to the datum point prior to the step of installing the
10 manufacturing equipment support apparatus.

19. The method of Claim 17 wherein defining a plurality of facilities connection point locations for manufacturing equipment support apparatus based on the datum
15 point comprises the steps of:

designing manufacturing equipment support apparatus;

20 establishing a plurality of facilities connection points on the manufacturing equipment support apparatus;

creating a portable floor map of the factory location, the map including a mapping of the manufacturing equipment support apparatus and the plurality of facilities connection points; and

25 providing the portable floor map to the factory location for the pre-facilitating step.

20. Support apparatus for manufacturing equipment having a bottom outline and a plurality of load-bearing
30 mounting feet disposed along the equipment's bottom outline comprising:

a plurality of support legs including at least one support leg aligned to each one of the plurality of load-bearing mounting feet; and

35 a frame disposed on the plurality of support legs.

The present invention provides support apparatus for manufacturing equipment comprising a support pedestal having (1) a plurality of support legs, including at least one support leg aligned to each one of a plurality of load-bearing mounting feet found on the bottom of the manufacturing equipment to be supported by the pedestal, and a frame disposed on the plurality of support legs; and/or (2) a frame with an outline which substantially duplicates the bottom outline of the manufacturing equipment to be supported, and a plurality of support legs coupled to the frame. The support apparatus additionally may comprise at least one facilities connection locator fixedly mounted to the support frame so as to provide facilities connection locations for aligning facilities supply lines to the manufacturing equipment.

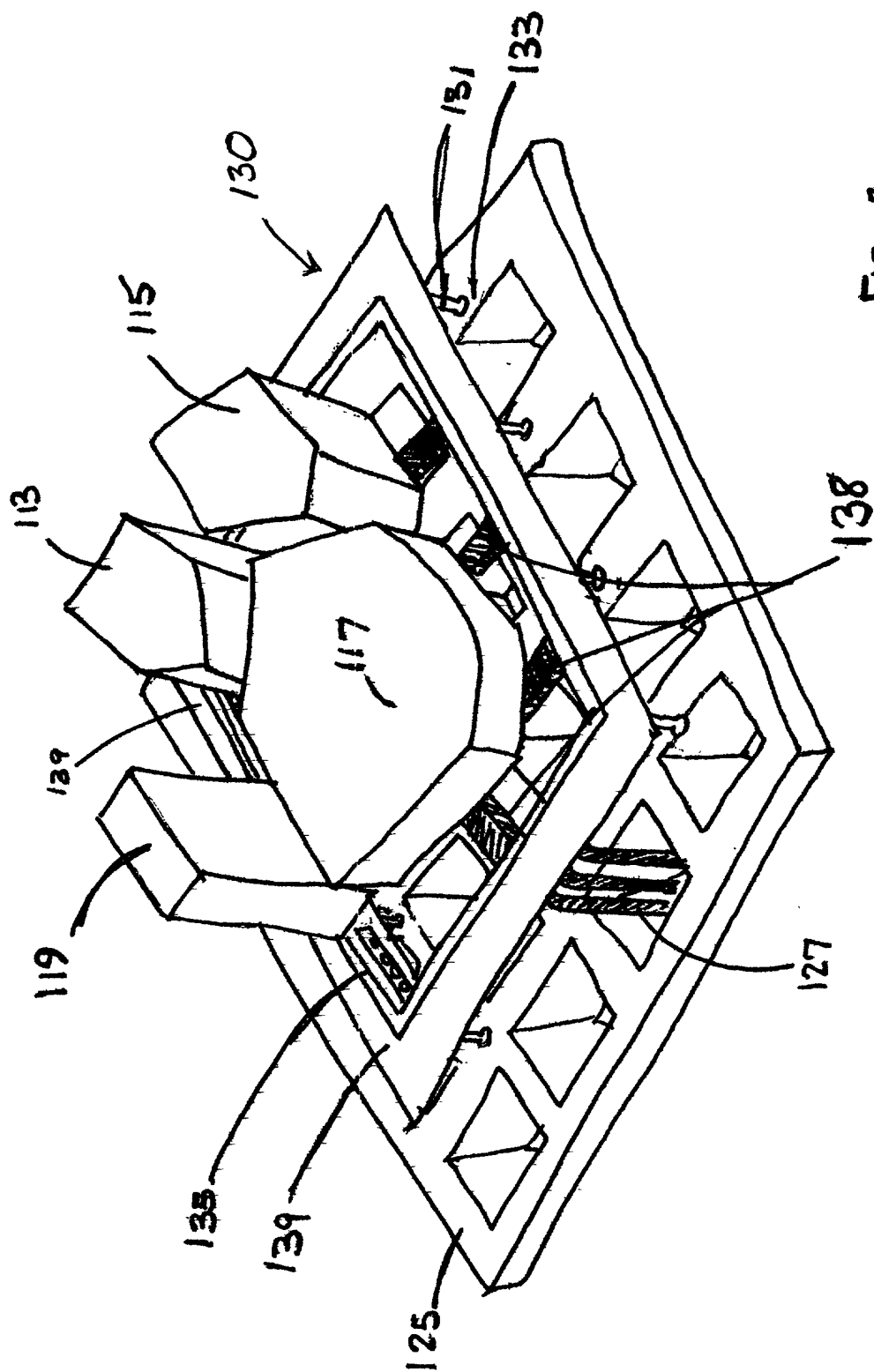


FIG. 3

PRIOR ART

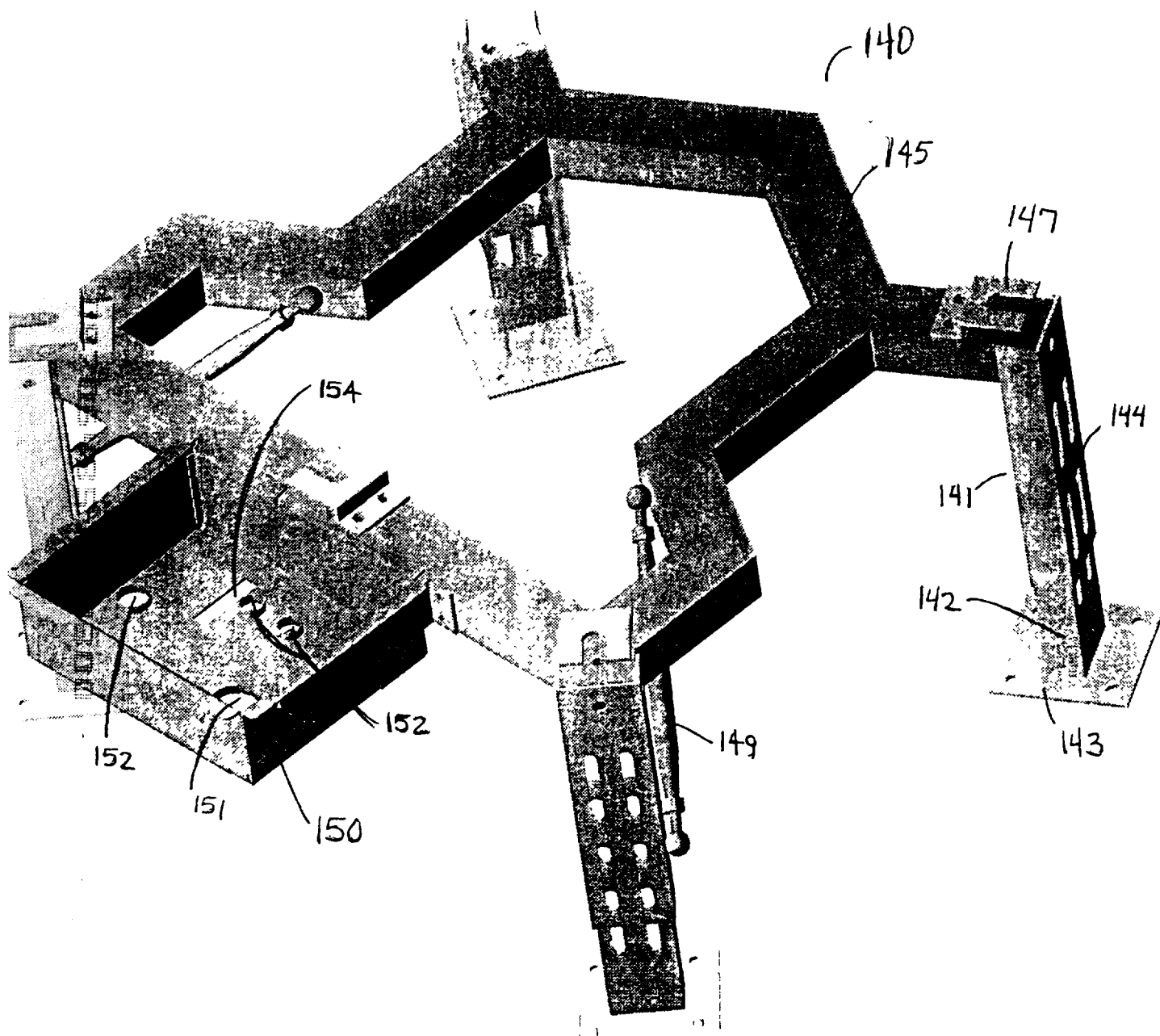
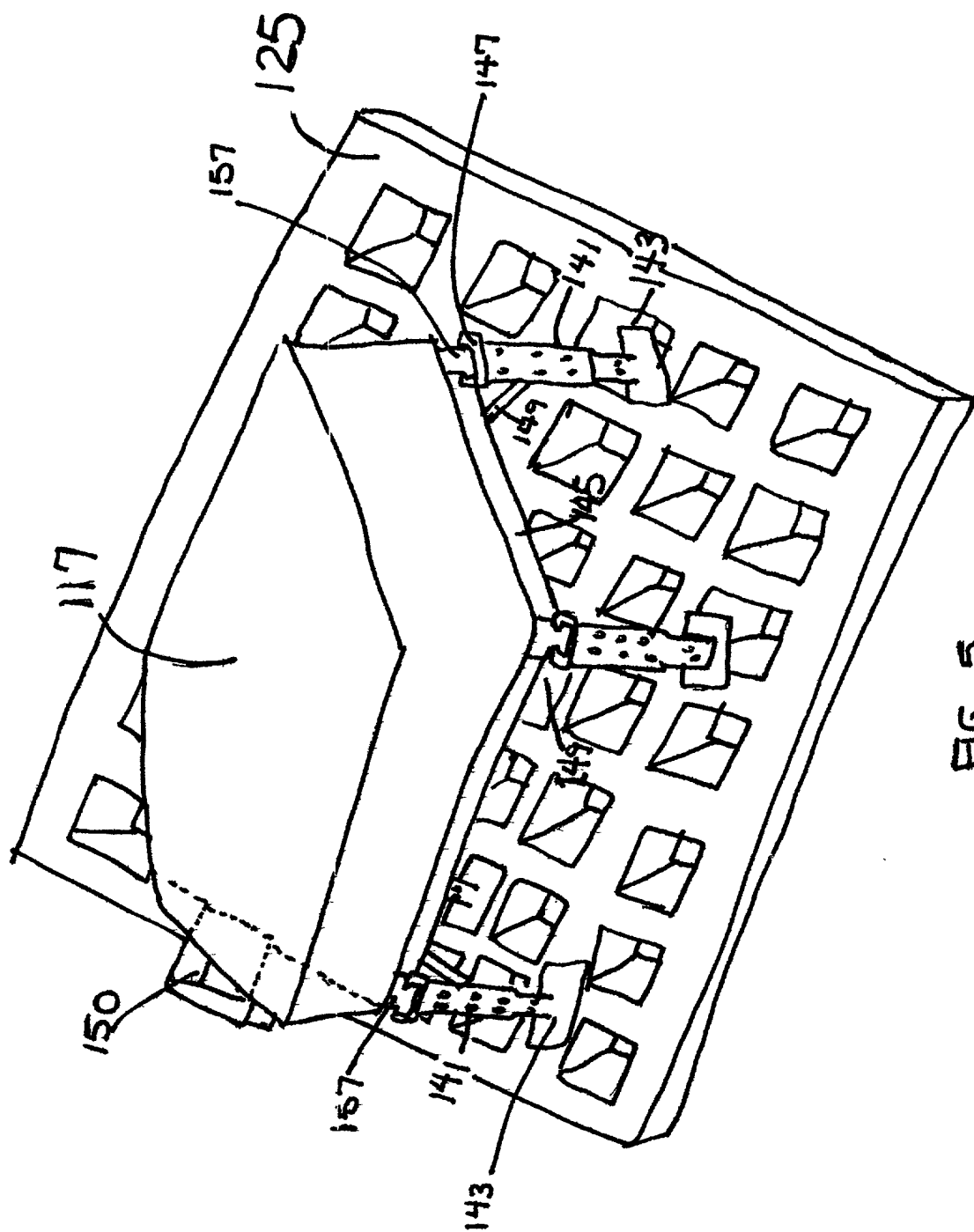


FIG. 4



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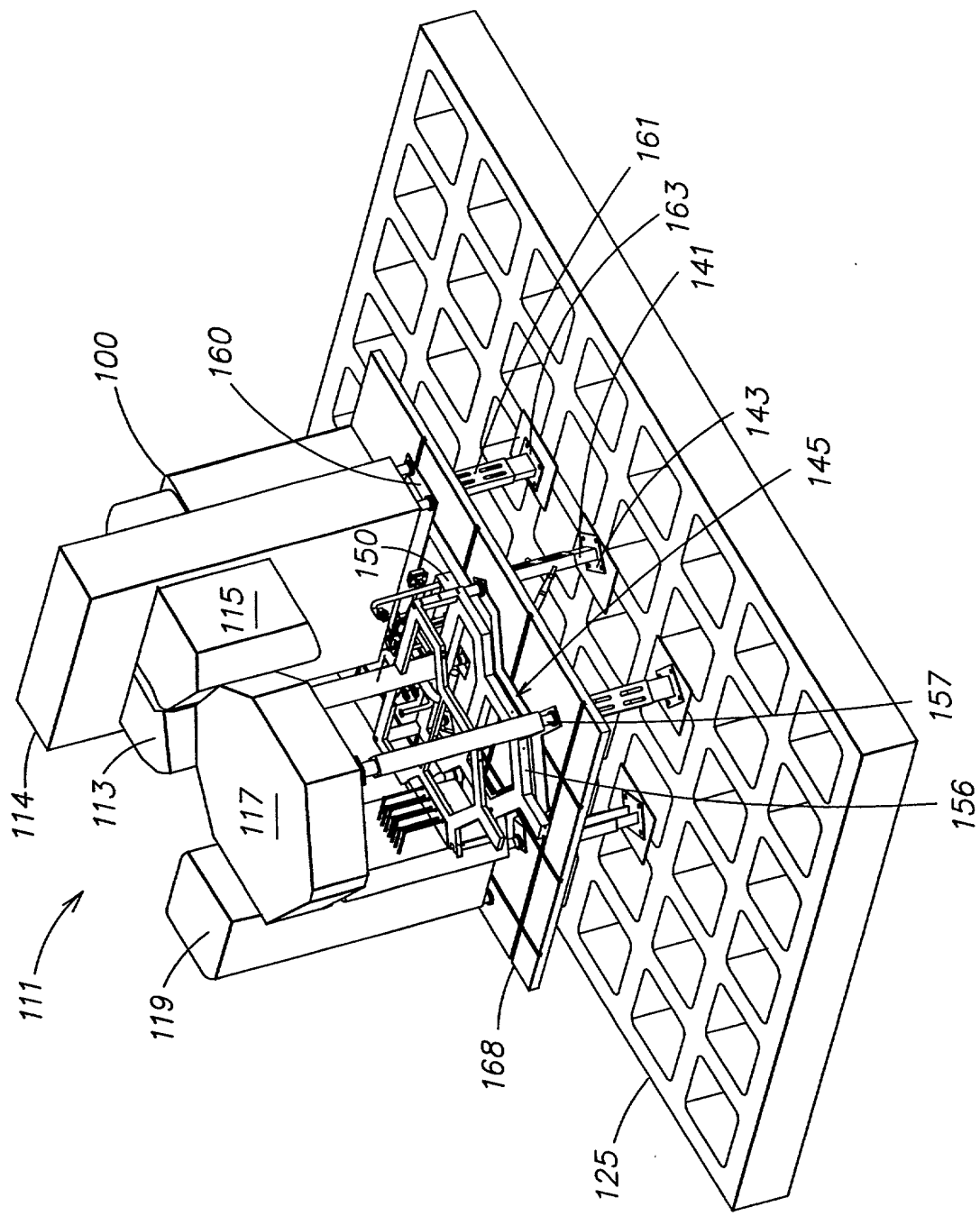


FIG. 7

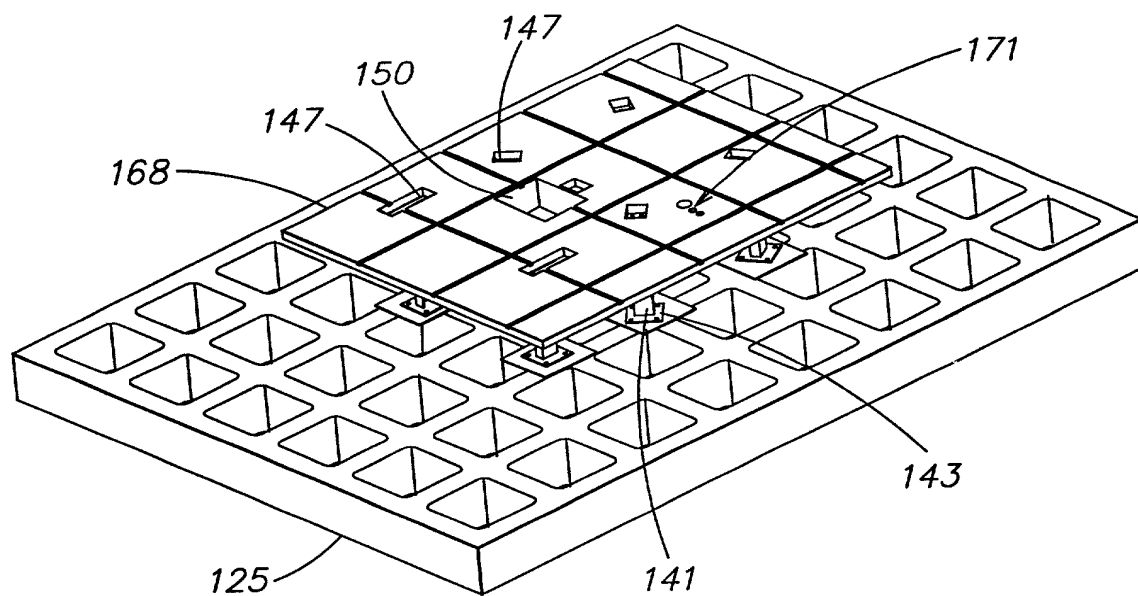


FIG. 8

FIG. 9

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FIG. 10

COMBINED DECLARATION AND POWER OF ATTORNEY

As a below named inventor, I hereby declare that:

This declaration is of the following type:

- ☒ original
☐ divisional
☐ continuation
☐ continuation-in-part

INVENTORSHIP IDENTIFICATION

My residence, post office address and citizenship are as stated below next to my name. I believe I am an original, first and joint inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

TITLE OF INVENTION

INSTALLATION DOCKING PEDESTAL FOR PRE-FACILITATION

OF WAFER FABRICATION EQUIPMENT

SPECIFICATION IDENTIFICATION

The specification of which:

- ☒ is attached hereto
☐ was filed _____, under Serial No. _____, executed on even date herewith; or
☐ Express Mail No. _____ (as Serial No. not yet known) and was amended on _____ (if applicable)
☐ was described and claimed in PCT International Application No. _____ filed on _____ and as amended under PCT Article 19 on _____.

ACKNOWLEDGMENT OF REVIEW OF PAPERS AND DUTY OF CANDOR

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information I know to be material to patentability in accordance with Title 37, Code of Federal Regulations, 1.56,

and which is material to the examination of this application; namely, information where there is a substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent, and

- ☐ In compliance with this duty there is attached an Information Disclosure Statement in accordance with 37 CFR 1.98.

PRIORITY CLAIM (35 U.S.C. §119)

I hereby claim foreign priority benefits under Title 35, United States Code, §119, of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America or of any United States Provisional Application(s) listed below, and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

- ☒ No such applications have been filed.
☐ Such applications have been filed as follows:

A. Prior foreign/PCT/provisional application(s) filed within 12 mos. (6 mos. for design) prior to this application, and any priority claims under 35 U.S.C. § 119

<u>Country/PCT</u>	<u>Application No</u>	<u>Date Filed</u>	<u>Priority Claimed</u>
			<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Yes <input type="checkbox"/> No

B. All foreign application(s), if any, filed more than 12 mos. (6 mos for design) prior to this U.S. application

Country:
Application No:
Filing date:

PRIORITY CLAIM (35 U.S.C. §120)

I hereby claim the benefit under Title 35, United States Code, § 120, of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose information that is material to the examination of this application (namely, information where there is substantial likelihood that a reasonable Examiner would consider it important in deciding whether to allow the application to issue as a patent) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application.

- ☒ No such applications have been filed
☐ Such applications have been filed, as follows:

<u>Serial No.</u>	<u>Filing Date</u>	<u>Status</u>
		<u>Patent Pending</u> <u>Abandoned</u>

POWER OF ATTORNEY

I hereby appoint the following attorneys and/or agents to prosecute this application and transact all business in the Patent and Trademark Office connected therewith:

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DECLARATION

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and, further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Sec. 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patents issued thereon.

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(Declaration ends with this page)